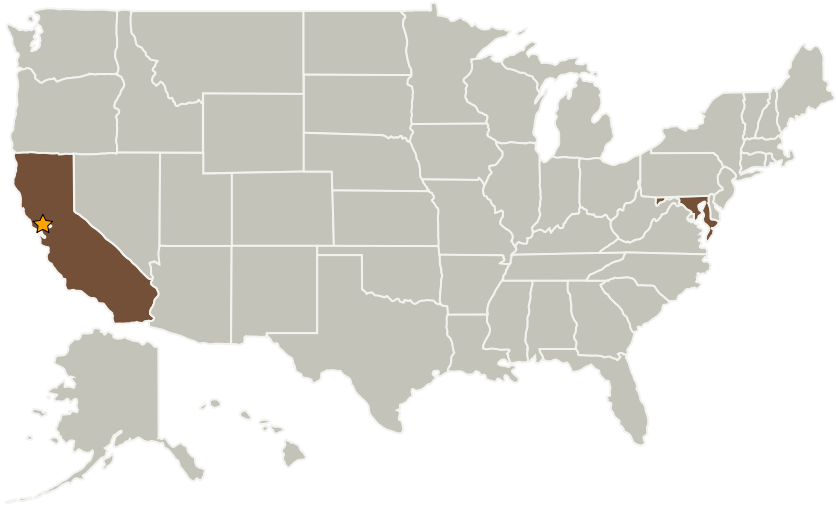
Agent-Based Health Monitoring System, Phase II

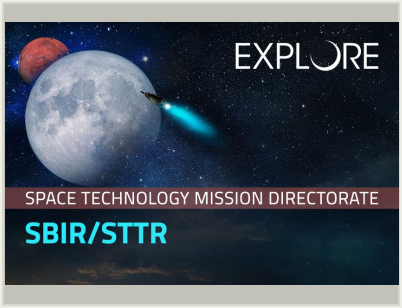
Completed Technology Project (2004 - 2006)

Project Introduction

We propose combination of software intelligent agents to achieve decentralized reasoning, with fault detection and diagnosis using PCA, neural nets, and maximum entropy methods. The goal of the work is to achieve integrated system health management and self-reliant systems, including integration with the maintenance and logistics scheduling systems to achieve fully automated end-to-end solutions. At low levels the agents will evaluate raw sensor signals to detect and diagnose the cause of anomalies. At the next higher level, the agents will combine the diagnostic results from multiple lower level agents to detect and diagnose anomalies in the interaction between components or subsystems. If there is a maintenance action or a spare part indicated by the prognosis, a Task Agent and/or a Spare Parts agent will be spawned to interact with the appropriate agent-based Scheduling System to insure that the requirements are met. Agents at each level are also responsible for performing graceful degradation in the event of a failure at their level. At the low level, we have demonstrated that the PCA algorithm can greatly reduce the amount of diagnostic data that must be shared between hierarchical levels. We have also demonstrated other algorithms for anomaly detection, diagnosis, and diagnostic data-fusion.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Ames Research Center (ARC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Ames Research Center(ARC)	Lead Organization	NASA Center	Moffett Field, California
Intelligent Automation, Inc.	Supporting Organization	Industry	Rockville, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.2 Reasoning and Acting
    - TX10.2.2 Activity and Resource Planning and Scheduling